

CREDIT RISK MANAGEMENT IN ISLAMIC AND CONVENTIONAL BANKS IN PAKISTAN**¹Ali Salman and ^{2,*}Dr. Alfred Mensah**¹University of Management and Technology, Lahore, Pakistan²School of Leadership and Management, Arden University, Tower Hill/Holborn Study Centres, UK**Received 27th January 2023; Accepted 25th February 2023; Published online 30th March 2023**

Abstract

This paper investigates the underlying factors affecting credit risk in Islamic and conventional banking systems in Pakistan. It is based on secondary research data from the annual financial statements and economic databases. The purpose of the study was to examine the impact of business-specific and macroeconomic variables on credit risk. The study used panel data for both Islamic and conventional banks from 2006 to 2015. The data was analysed using descriptive statistics, t-test, OLS, panel random, and fixed effect regression to check the robustness of the model. The Hausman fixed test was applied to test the application of random and fixed effect models. Results demonstrate that the fixed effect model is more appropriate, and ROE, ROA, cost efficiency, Diversification, GDP growth rate, CPI, and CCG have a negative relationship with credit risk. Cost efficiency and CPI show a significant negative relationship with credit risk, whereas leverage shows an insignificant positive relationship with credit risk (NPL). Thus, the findings revealed that credit risks are higher in Islamic banks compared to conventional banks. Also, it was revealed from the study that cost efficiency and inflation significantly affect the credit risk of Islamic banks as compared to conventional banks.

Keywords: NPL, ROE, ROA, Size, CPI, CCG, Leverage, Diversification. Islamic and conventional bank.

INTRODUCTION

One author [16] defines credit risk as the risk of financial loss due to the borrower's, bond issuer's or counterparty's (the "obligors") failure to honour their financial obligations. There are repercussions for poor credit management in the banking sectors and the global economy. Consequently, proper credit management is crucial for the banking sector. For instance, if Credit is well managed, it can lead to economic development and efficient allocation of capital and wealth creation within a nation which can bring about prosperity. This makes risk management a requirement in the financial system as poor credit management affects everyone and the global economy [16]. A study [13] however discovers that Credit risk management in banks has become more necessary not as an outcome of the financial crisis that the world is experiencing currently but also as an outcome of the introduction of Basel II. This research article explores the underlying factors affecting credit risk in Islamic and conventional banking systems in Pakistan. It is based on secondary research intended to examine the impact of business-specific and macroeconomic variables on credit risk.

Background of Islamic bank

The origin of Islamic finance can be traced to the birth of the Islamic religion. The fundamentals of Islamic finance are based on the primary sources of the Quran and Sunnah. Sunnah narrates the sayings and deeds of the holy prophet (p.b.u.h). Consequently, signs of current Islamic financial contracts can be traced from ancient Arab culture and practices². The role of Islamic banking has grown significantly in terms of its volume in the global financial industry over the years. Indeed, it has not only served domestic Muslim-majority countries but has also expanded its footprints in non-Muslim-majority countries.

Islamic finance is being accessed by more than 250 financial institutions across the globe [7]. The Islamic banking industry has extended its horizons from a regional to a global level since its beginning in 1975. Sudan and Iran have completely transformed their financial system into Islamic banking and finance. Malaysia, Pakistan, Indonesia, Bangladesh, Jordan, and Egypt run parallel dual banking systems. Most conventional banks initiated offering window Islamic banking in most countries, but over time, independent Islamic banking branches are being launched through gaining technical expertise. The Islamic financial service industry includes various financial institutions: commercial banks, investment banks, and takaful insurance institutions. However, for future sustainability and growth of the industry, the systematic stability of the core functions of the financial industry in terms of transactions is the main concern. Consequently, risk management practices are significant and imperative for financial institutions. The risk is defined as the level of uncertainty prevailing in the contract where a borrower fails to meet the financial obligation according to the agreed terms and conditions of the contract. Conventional banks do interest-based financing, whereas Islamic banks follow profit and loss-sharing financing and nonprofit and loss-sharing financing. Hence, it can be understood that Islamic banks are exposed to higher risk in comparison to conventional banks. Under PLS., the risk transfers from the asset side of the balance sheet to the credit side. Banks rarely use PLS contracts on the liabilities side of their balance sheet with their depositors to protect them from adverse return volatility. The reason may be to protect the goodwill in the eyes of their depositors. For example, a depositor deposit money in a PLS account, and the next day, the investor finds the loss in his account will result in customer loss; therefore, the majority of banks accept deposits on Mudarabah-based contracts [10]. The risk process includes identifying, measuring, monitoring, and controlling the risk through impaling sound risk mitigation strategies.

Table 1. Islamic Financial Contracts and their respective Credit risk Islamic financial contracts and their respective credit risk

PLS. sharing contracts	Definition	Comments
Musharakah (Profit and Loss Sharing)	It is an equity-based participation contract where two parties jointly invest capital in a long-term project, and profit is shared based pre-determined ratio. In contrast, a loss would be shared on an equity-based ratio.	Chances of credit risk due to asymmetric information between a bank and investing partner ⁸ .
Mudharabah(profit sharing)	There are two parties involved in this contract: One who owns capital is called rabul-mal, and another who uses that capital for investment purposes is called Mudharib. The profit is shared between both parties on a pre-determined ratio. In the case of loss, Rabul-mal will bear the risk of losing capital, whereas mudaraib will lose in terms of effort and time. If negligence is proved on behalf of the mudharib then he would be responsible for sharing the loss. It is used mostly in trade and commerce. The assets side of Mudharabah is defined as restricted mudarabah, whereas the liabilities side is classified as unrestricted Mudaraba. In the case of a moral hazard issue, a bank will be hesitant to do a business deal as it will be difficult to monitor the activities of an entrepreneur.	The problem of moral hazard as a bank will not participate in the business decision-making; hence, it is difficult to monitor the entrepreneur's activities. Chance of window dressing in the financial statement by the entrepreneur to evade sharing of profits with the bank.
Muzarah	It is a Mudarabah-based contract in the agriculture industry where the bank (landowner) owns the agricultural land. Muzarah cultivates the land and shares a fixed pre-determined profit ratio with the owner.	The problem of moral hazard where Muzarah may not disclose the actual profit earned through harvesting the crops. Therefore, in practice, Muzarah gives a fixed market rate of profit to the land owner at the beginning of the contract, and Muzarah will enjoy all the profit at the end.
Non PLS. contracts	Definition	Comments
Salam (At spot payment for future delivery)	The bank pays the full price on the spot for future product delivery at a specific date. It applies to those products like agriculture and manufacturing whose quality and quantity are fully confirmed per the contract ⁷ .	Risk exists in three ways: 1. The customer does not deliver the product on time, 2. The product fails to meet the specified criteria. 3. The value of the delivered product fails to meet the value of the payment.
Istisna	It is a contract of exchange for future delivery of manufacturing goods. The conditions are Non-fixation of date and time of future delivery The manufacturer provides all raw materials for the completion of the product. Payment can be made in a lump sum or instalment ¹⁰ .	In parallel istisna, non-delivery of the product by the manufacturer may result in banks buying it at a higher price from the market and fulfilling the commitments per the second contract of delivery of the good.

Key features of Islamic bank

There is the prohibition of fixed interest, whether it is in terms of receipt or payment. Interest is replaced with a Profit and Loss sharing contract where the financial assets' return is uncertain. The rate of return is determined by ex-post profit realized profits generated from real sector activities. Each bank has a Shariah board that ensures shariah compliance in product development and investment. They also ensure the bank is not involved in harmful activities like alcohol, pork, gambling, and extremely high level of risk (Gharar). Existence of shariah compliance in all modes of financing and operation. There are two major categories of financing, and one is PLS-based financing which is also asset-based contracts. The second is a non-PLS-based mode of financing.

Objectives

- To compare credit risk between Islamic and Conventional banks in Pakistan.
- To identify the factors which significantly affect the credit performance of Islamic and conventional banks.

The research questions from the above objectives are as follows:

- Do Islamic banks possess higher credit risk in comparison to conventional banks?
- What macroeconomic variables significantly affect the performance of banks in Pakistan?

The remainder of the paper is organized under three sections: literature review, methodology, finding, analysis, and conclusion.

LITERATURE REVIEW

The major difference between Islamic and conventional banks is interest-free banking. Islamic banks offer non-participatory and participatory products as an alternative to conventional products, such as Mudarabah, Murabaha, Salam, Istisna, and Musharakah. Most scholars believe that product differentiation is the major prominent factor for the difference between Islamic banks and conventional banks, apparently but not intrinsically [18]. Intensive work has been carried out by researchers in measuring credit risk under conventional banking. However, a limited study has been conducted to measure the financial stability of both banks. Under conventional banking, banks provide loans to customers by charging interest on the principal amount. Yet, credit risk under conventional banking is adjusted by increasing the markup. On the contrary, under Islamic banking, they are not allowed to charge interest in case of payment delay [16]. In Malaysian Islamic banks, 90 % of their total assets financing is based on Murabaha-based financing¹⁹. Most researchers have incorporated bank-specific factors in analyzing credit in their study. Moreover, we have employed bank-specific and macroeconomic factors that significantly affect credit risk. Islamic finance is primarily based on 2 major modes of financing. Asset-based financing and asset-back financing. Asset-based mode of financing is Mudarabah, Murabaha,

Istisna, and Salam. The asset back mode of financing is Sukuk. Credit risk management always remains the main concern for the business and financial sectors worldwide, especially the banking sector. Banks measure credit risk through non-performing loans. NPL is classified when the payment is due from the borrower for more than 90 days. Instalment payment comprises interest payment and the principal amount. It is pertinent for the banks as delay in payment affects banks' profitability and eventually pushes them into a future liquidity crunch. Many studies suggest that there are numerous causes for credit risk. Most studies suggest that credit risk arises from bank-specific factors, and secondly, some researchers debate that macroeconomic variables are also significant factors for causing credit. Limited studies have incorporated bank-specific and macroeconomic factors in designing credit risk management frameworks. A study [27] discovered the impact of economic factors on credit risk management in the banking sector of Greece. In comparison, business-specific factors are used as an explanatory variable. Their study shows that the NPL (dependent variable) is majorly explained through independent variables like unemployment, gross domestic, and interest rate. Bank-specific variables are explained through various variables, loan quality, total assets, and capital.

A study [18] discovers that the reason for the failure of financial institutions was related to bank-specific variables like management competencies, bank earnings and quality of assets, and capital adequacy. Under Islamic banking rules, banks are not permitted to use debt-based instruments as speculative instruments to mitigate risk. Banks are also not allowed to use collateral to cover losses in case of bankruptcy⁵. It makes Islamic banks riskier than conventional banks. Over the years, the state bank of Pakistan has been keenly determined to promote Islamic banking in Pakistan. State Bank of Pakistan Shariah Advisory Council keeps issuing circulars with problems in the banking sector. Similarly, every loan application in Islamic banks is processed through the Shariah advisory body of every bank for evaluating the moral hazard risk (know yourself) before the funds are issued. During this tenure, if Shariah advisory finds the probability of malicious intention, they reject the application, but in some banks, file processes through the second stage of the credit department, or it may reach to state bank of Pakistan for further verification. Hence, these measures tend to reduce the credit risk of Islamic banks in Pakistan. An author [22] studied the credit risk of advanced 26 developed economies from 1998 to 2009 and found that credit risk increased due to deteriorating economic conditions like rising unemployment, interest rate, and low economic growth. Farhan⁹ studies the performance of Pakistan's banking sector in terms of credit risk and concludes that exchange rate and interest rate are the significant factors affecting banks' credit risk. A study [1] compared the credit risk of Islamic banks with commercial banks in Malaysia from 1996 to 2002. The data sample consists of six Islamic window banks, one full-fledged bank, and six commercial banks. The results show that bank size, management efficiency, and risk-weighted assets have a significant influence on the credit risk of an Islamic bank

Variables description

There are two categories: bank-specific variables and macroeconomic variables. The data for bank-specific variables were collected from the annual reports of banks. Moreover, the macroeconomic variable data is taken from the world

economic outlook database issued by IMF (International Monetary Fund). Bank specific variables data were collected from the banks' annual reports

The details of the variables used in the study are shown in table 2.

Table 2. Data Description and Sources

Variables	Description	Sources
Independent variable (Bank Specific Variables)		
Bank Leverage	Equity to Total assets	Annual reports
Return on Assets	Net income to total assets	Annual reports
Return on Equity	Net income to tier 1 equity	Annual reports
Cost efficiency	Cost to income ratio	Annual reports
Diversification	Noninterest income to total income	Annual reports
Size	Total assets(natural logarithm of total assets)	Annual reports
Independent (Macroeconomic Variables)		
GDP.	Nominal annual GDP growth rate	World Economic Outlook database
Inflation(CPI)	Change in the consumer price index	World Economic outlook database
Corporate Governance (CCG.)	Kaufmann et al. governance indicators	Worldwide governance indicators
Dependent Variable		
Non-performing loans ratio (NPL)	Non-performing loans to gross loans	Annual reports

Research Hypothesis

Non-performing Loan is the amount due to a bank from the borrower when the duration period exceeds 90 days. Therefore, there is a positive relationship between the non-performing ratios and the bank's credit risk. Many researchers have used the NPL ratio as a proxy for credit risk. It is calculated as non-impaired loans to gross loans. A higher ratio explains the bank's chances of becoming insolvent [1].

Independent Variables Hypothesis

Return on assets is used as a proxy to measure management performance. Return on assets represents the net income generated out of the total assets. Thus, a higher return on assets represents efficient utilization of assets. Higher income can come as a product of high income generated through raising the amount of commission or fines income, increasing interest on borrowing. For instance, researchers explain different relationships between return on assets and non-performing loans. Some studies [4,5]. show a significant positive relationship between the return on assets and NPL. Whereas, according to Chaibi [8], there is a negative relationship between ROA and NPL ratio. In our study, we consider a negative relationship between ROA and NPL.

H_0 . There is a negative relationship between ROA and NPL.

There is an assumption that it is hard for big firms to fail. Therefore, based on this assumption, the impact of firms' total assets on credit risk is also incorporated in the research. Large firms are believed to employ higher human capital and technological resources in their organization to properly and timely manage the risk to avoid insolvency. For example, large banks employ highly qualified and trained credit risk management teams who can properly scrutinize the cases of clients (borrowers). Secondly, banks invest in a more high-tech operating system which assists in measuring the level of risk

associated with an individual asset and its correlation to the portfolio's overall risk. Previous studies also verified it [19,27]. Hence, the derived null hypothesis is

H_0 : There is a negative association between the firm total assets and credit risk.

Business efficiency is judged through the cost to income ratio of any organization. If cost increases more than income, it depicts poor management efficiency in controlling the cost associated with issuing and monitoring the borrower. It is also supported by Masmoudi and Abid [26]. study. The derived null hypothesis is:

H_0 : There is a negative relationship between cost efficiency and credit risk.

Diversification helps the bank identify profitable business products from non-profitable products. It is calculated as non-interest income to total income. Generally, it helps the banks to reduce the credit risk by allocating more funds weight to low credit risk assets from the overall credit risk of the portfolio [1, 8, 9]. In this study, three variables are incorporated, which indicate the macroeconomic factors in credit risk management. There is a consensus among scholars that economic growth creates better job and business opportunities in an economy which ultimately increases an individual's income per capita, resulting in low-risk credit failure. Moreover, during the recession, a fall in income per capital increases the risk of nonpayment of contractual obligations, increasing NPL [18].

H_0 : There is a negative relationship between economic growth and NPL.

Philips curve states a negative relationship between inflation and unemployment. The increase in the general price level in the economy encourages the producer to produce more; hence, it causes a fall in unemployment and an increase in income per capital, reducing the chances of the occurrence of non-performing loans in the banks. On the other side, inflation makes lenders vulnerable and borrowers better off due to a delay in the time of money.

METHODOLOGY

Six banks were selected for the current study: three Islamic banks and three commercial banks. The banks were selected based on the availability of data. Bank-specific and economic-specific data were collected for 7 years (from 2009 to 2015). Data collection sources were the banks' annual reports from their respective websites, and macroeconomic variables data is collected from the World Bank database. This study employed panel data to determine the factors affecting credit risk in Islamic and conventional banks, consisting of bank-specific and macroeconomic variables. Panel data included cross-section and time series data. The data was generated from their annual reports. The final data was analysed using panel data analysis. The reason for selecting the panel data analysis technique for the current study is that it could help to understand changes at the individual bank level. Additionally, it could mitigate the problem of multicollinearity and provides degrees of freedom in research. There is a total of 60 observations. Financial data for some banks were unavailable, like Burj Bank for the year 2006, and data for the corporate governance index for 2015 was also missing. The model can be articulated through the following equation.

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \mu_{it}$$

"Y" refers to credit risk, and "t" time. Credit risk is a dependent variable of Islamic and conventional banks in Pakistan. NPL (Non-performing Loans) is used as a proxy to represent the credit risk for Islamic and conventional banks. The description of the variables is given in Table2

$$CR_{it} = \beta_0 + \beta_1 ROE + \beta_2 Leverage + \beta_3 Cost\ to\ Income + \beta_3 size + \beta_4 Diversification + \beta_5 GDP\ growth\ rate + \beta_6 CPI + \beta_7 CG + \alpha_{it} + \tilde{\nu}_{it}$$

C.C.R.: Credit risk of conventional and Islamic banks

β_0 : It is the y-intercept

β : are the coefficient of the independent variables

α_{it} : these are unobservable bank-specific variables

$\tilde{\nu}_{it}$: Idiosyncratic error

The statistics tested involve panel vector autoregression involving OLS regression, fixed effect regression, random effect regression, and post-estimation test, including the Hausman specification test. (1)

FINDINGS AND ANALYSIS

The following table shows the correlation between the dependent variable: credit risk and the independent variables, return on equity, leverage, return on assets, the cost to income, bank size, diversification, GDP growth rate, and CPI. Table 3 shows the descriptive statistics, and the bank code shows the number of banks in table 6. The data shows strongly balanced data. The total number of observations is 60. Diversification, which is described as noninterest income to total income for Islamic and conventional banks, shows a higher average mean of 99.52. The cost of income ratio shows an average mean value of 54.6041. However, the corporate governance mean value is - 5.8335, which shows that the overall performance of the corporate governance index of Pakistan is not satisfactory; According to Kaufman²⁶, there are six parameters for valuation, 1) control of corruption, 2) Government effectiveness, 3) political stability and Absence of violence, 4) Regulatory quality, 5) Rule of Law, 6) voice and Accountability.

Table 4 shows a pairwise correlation between dependent and independent variables. The values of correlation range from -1 to +1, a value near 1 shows a strong positive relationship, whereas a value near -1 shows a strong negative relationship between two variables. The value of a correlation coefficient less than 0.5 is described as a weak correlation between two variables. However, a value greater than 0.8 is a strong positive correlation. A value near 0 is defined as a nonlinear or weak correlation between the two variables shown in the table. NPL has a negative correlation with most of the independent variables like ROA (-0.051), a cost to income (-0.143), size (-0.156), diversification (-0.059), GDP growth rate (0.085), CPI (-0.073) and corporate governance (-0.008). As expected, it shows that the bank's overall performance falls with an increase in the NPL ratio and the GDP growth rate explains a weak positive correlation with the NPL ratio. It means that as an economy improves, the credit risk in the banks also increases, but there is a weak relationship. An Independent sample T-test is carried out to investigate the difference between the financial ratios of Shariah and conventional banks in Pakistan.

Table 3. Descriptive Statistics

One-Sample Statistics					
	N	Mean	Std. Deviation	Std. Error Mean	I. VIF
ROE1	60	14.78112	20.582289	2.657162	1.945
Leverage	60	11.69378	10.718196	1.383713	1.414
NPL1	60	38.92360	252.649637	32.616928	
ROA1	60	1.44629	4.196589	.541777	1.350
Cost to Income1	60	54.60413	27.704184	3.576595	1.237
Size	60	13.32096	3.061857	.395284	1.432
Diversification1	60	99.52064	149.538335	19.305316	1.158
GDP growth rate	60	3.84367	1.554545	.200691	7.424
CPI	60	10.23000	4.697432		6.659
CG	60	-5.83360	2.024442		1.694

Table 4. Pairwise Correlation table

	ROE.	Leverage	NPL	ROA	Cost to income	size	Diversification	GDP rate	CPI.	CG
II. ROE	1.000									
Leverage	-0.330	1.000								
NPL	-0.101	0.180	1.000							
ROA	0.289	-0.086	-0.051	1.000						
Cost to Income	-0.196	-0.092	-0.143	-0.218	1.000					
Size	0.274	0.089	-0.156	-0.026	0.018	1.000				
Diversification	-0.090	-0.069	-0.059	-0.154	0.047	0.207	1.000			
GDP growth rate	0.219	-0.055	0.085	-0.136	-0.052	-0.105	-0.023	1.000		
CPI	-0.096	0.164	-0.073	0.079	-0.125	0.011	-0.113	-0.861	1.000	
CG	-0.004	-0.077	-0.008	-0.071	0.030	0.056	0.063	0.529	-0.60	1

Table 5. Regression Models

III. Independent variables	IV. Dependent Variable: Credit risk					
	OLS Regression		V. Fixed Effect		Random Model	
	Coeff	SE	Coeff	SE	Coeff	SE
ROE.	.3009	2.279	-.067016	2.567	.3009132	2.279259
Leverage	5.137	3.736	.1543496	4.299	5.136826	3.735766
ROA	-6.174	9.332	-2.385621	9.1743	-6.174	9.332218
Cost to Income	-1.737	1.356	-7.57755	2.1556***	-1.737	1.355939
Size	-15.568	13.170	25.95808	18.41293	-15.5675	13.1698
Diversification	-.0891	.2433	-.5373906	.3998	-.0810	.2433118
GDP growth Rate	-39.824	57.493	-78.74483	58.156	-39.8235	57.49244
CPI	-20.494	18.239	-37.334*	18.604	-20.495	18.23919
Corporate Governance	-10.485	21.122	-15.68048	19.644	-10.485	21.12232
Constant	594.322	491.849	752.9166	497.623	594.32	491.8494
R- square	0.1102		0.2585		0.1097	
No of observation	60		60		60	
Fixed Effect	NO		yes			
Prob > F/ Prob > chi2			0.0284		0.7208	

Note: The panel autoregression technique is followed to test the appropriateness of the overall model. Column 1 represents OLS regression statistics, Column 2 represents the fixed effect regression model, and Column 3 represents the random effect model. *** denotes the level of significance at 1%, **

As shown in the table, there is no significant difference between ROE, NPL, and ROA with P values of 0.40, 0.055, and 0.195, respectively. All these values are greater than the 5% significance level; therefore, it shows no difference in the following ratios of both Islamic and conventional banks in Pakistan. However, a significant difference is found in leverage, the cost to income ratio, size, and diversification with their P values of 0.00, 0.055, 0.011, 0.021, and 0.00. As macroeconomic variables are the same for both banks, there are no differences between them.

The test of the robustness of the overall model, panel vector autoregression model, and fixed effect model is run; the F value is less than 5 %, which means that model is perfectly fit and all coefficients are not equal to zero. Table 5 represents regression analysis models, column 1 represents regression analysis between dependent and independent variables based on the OLS model, Column represents regression based on the fixed effect model, and column 3 represents regression based on the random effect model.

R- Square under the OLS regression model shows a value of 11.2%. Overall, it shows only an 11.2% variation in the dependent variable, credit risk, explained by six business-specific variables and 3 macroeconomic-based variables. Business-specific variables are Return on Equity (ROE), Leverage, Return on Assets (ROA), and Cost efficiency, represented by the cost to income ratio, size of total assets, and diversification in the total pool of income. Macroeconomic variables are GDP annual growth rate, CPI, annual inflation rate, and corporate governance. ROA, cost efficiency, size, diversification GDP growth rate, CPI, and corporate governance show a negative relationship with the banks' credit risk. CPI and GDP show a high value of negative β . It is because GDP is calculated on the summation of market prices of all goods and services produced in an economy; therefore, there is an element of multicollinearity; hence, VIF value shows higher values for both of these variables, as shown in Table 4. Leverage shows a positive correlation coefficient of 5.137 with credit risk. It means that as the owner's equity increases, there are high possibilities for increasing the bank's

credit risk. Surprisingly, none of the above values shows any significant relationship in the model. 594.322 value of constant shows that there are other, outside the model business-specific variables that can explain the relationship with the credit, which can be management-specific or financial performance specific.

Under fixed effect panel model regression, cost efficiency shows a significant negative relationship at a 1% significance level. It means that as the cost of bank increases, credit risk falls. It may be that if the bank invests in employees' training and employs the latest technologies, such as risk management information systems or customers' credit history details through NADRA, there is a high chance that the bank's credit risk will be reduced. CPI shows a significant relationship with credit risk at a 10 % level of significance. Only the size of the firm (log of total assets of the banks) shows a positive relationship with the credit risk, but it is a non-significant variable. The model's explanatory power is 25.82 %, which overall results better than the OLS model result. The Chi value of the model shows 0.0284, which is less than 5 %, which means the overall model is significant and more reliable. In column 3, the R-square value of the random effect model is 10.97% which is very low, and the F probability of 0.1097 is also not significantly greater than 10%. Hence, we reject the random and OLS effect model and accept only the fixed effect model.

Conclusion

This paper attempted to investigate the factors affecting credit risk in Islamic banks compared to their counterparts' conventional banks. Previous studies focused on accounting-based methods only in evaluating the credit risk in Pakistanis banks. However, we have employed macroeconomic variables along with accounting approaches to carry out more reliable and intrinsically valuable research which may help both academically and practically for the banking industry for better decision-making. Results show that financial ratios and macroeconomic variables are imperative in measuring credit risk. Based on financial ratios analysis, results show the mean value of non-performing loans of Islamic banks is a higher value of 68.075 than conventional banks, 7.76. This result contradicts the results of Awatef and Younes (2015). The reason may be that Islamic banks follow asset-back financing like Musharakah and Murabaha, where the depositors share the burden of credit risk with financial institutions. The leverage ratio means a value of 15.11 is higher than a conventional bank's value of 7.76. The conventional bank ROA ratio is higher than Islamic banks, with a mean value of 2.85 and 0.1267, respectively. The cost-to-income ratio in Islamic banks is higher than in conventional banks, with mean values of 66.85 and 41.51. The fixed effect random model shows an R2 value of 25.85%, which is higher than the other two regression analysis models. The results show that the cost-to-income ratio is a significant factor affecting the credit risk among business-specific variables; it is significant at 1% significance at a P value of 0.001. Among macroeconomic variables, CPI is significant at a 10% significance level at a P value of 0.051. Only two factors show significance with NPL, which is used as a proxy to measure credit risk in the complete model. As R2 is below 30%, thus, it proves that other variables explain the level of the credit risk of banks in Pakistan, which are not integrated into this study. Therefore, this study helps future researchers to fill this gap in their future studies.

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APPENDICES

Table 6. Descriptive Statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
ROE.	56	-.2010	.9965	.134123	.2153543
Bank Codes	60	1	6	3.50	1.722
ROA Ratio	58	-.0350	.3130	.012633	.0423885
Leverage(EQUITY/TOTAL ASSETS)	59	.0149	.5350	.118873	.1070275
NPL Ratio	57	.0000	19.6310	.408074	2.5918967
cost to income	59	.0000	1.3200	.548544	.2787414
GDP growth rate	9	2	6	3.78	1.394
CPI	9	7	20	11.22	4.236
Size	59	8.30000	20.27770	13.5587524	2.53601881
Diversification	58	.0000	5.1700	.985897	1.5342411
CG	9	11	15	12.33	1.414
Valid N (listwise)	8				

Table 7. Descriptive Statistics

Group Statistics					
	Bank Category	N	Mean	Std. Deviation	Std. Error Mean
ROE1	conventional	29	24.50335	23.022414	4.275155
	Syariah	31	5.68614	12.712084	2.283158
LEVERAGE1	conventional	29	8.03859	3.253719	.604201
	Syariah	31	15.11315	13.822166	2.482534
NPL1	conventional	29	7.76134	3.496875	.649353
	Syariah	31	68.07538	351.721007	63.170958
ROA1	conventional	29	2.85682	5.587675	1.037605
	Syariah	31	.12677	1.331382	.239123
Cost to Income1	conventional	29	41.51207	14.831803	2.754197
	Syariah	31	66.85154	31.360088	5.632438
size	conventional	29	14.01294	2.191289	.406912
	Syariah	31	12.67363	3.613853	.649067
Diversification1	conventional	29	29.66914	19.516626	3.624146
	Syariah	31	164.86559	185.724652	33.357132
GDP growth rate	conventional	29	3.76069	1.529325	.283989
	Syariah	31	3.92129	1.599022	.287193
C.P.I.	conventional	29	10.49655	4.586976	.851780
	Syariah	31	9.98065	4.860619	.872993
C.C.G.	conventional	29	-6.03476	1.749464	.324867
	Syariah	31	-5.64542	2.264471	.406711

Table 8. T-test

Independent Samples Test		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
ROE1	Equal variances assumed	.718	.400	3.953	58	.000	18.817214	4.759829	9.289381	28.345047
	Equal variances not assumed			3.883	42.986	.000	18.817214	4.846623	9.042974	28.591454
LEVERAGE1	Equal variances assumed	20.776	.000	-2.686	58	.009	-7.074564	2.633712	-12.346511	-1.802617
	Equal variances not assumed			-2.769	33.533	.009	-7.074564	2.555002	-12.269616	-1.879512
NPL1	Equal variances assumed	3.821	.055	-.923	58	.360	-60.314038	65.352281	-191.130842	70.502765
	Equal variances not assumed			-.955	30.006	.347	-60.314038	63.174295	-189.332018	68.703941
ROA1	Equal variances assumed	1.717	.195	2.643	58	.011	2.730051	1.033034	.662209	4.797893
	Equal variances not assumed			2.564	30.972	.015	2.730051	1.064803	.558291	4.901811
Cost to Income1	Equal variances assumed	6.895	.011	-3.956	58	.000	-25.339466	6.406070	-38.162609	-12.516323
	Equal variances not assumed			-4.042	43.403	.000	-25.339466	6.269765	-37.980259	-12.698674
size	Equal variances assumed	5.649	.021	1.721	58	.091	1.339304	.778174	-.218380	2.896988
	Equal variances not assumed			1.748	49.949	.087	1.339304	.766072	-.199435	2.878043
Diversification1	Equal variances assumed	167.805	.000	-3.898	58	.000	-135.196448	34.684746	-204.625510	-65.767385
	Equal variances not assumed			-4.029	30.708	.000	-135.196448	33.553431	-203.655519	-66.737376
GDP growth rate	Equal variances assumed	.137	.712	-.397	58	.693	-.160601	.404503	-.970301	.649100
	Equal variances not assumed			-.398	57.969	.692	-.160601	.403893	-.969089	.647888
CPI.	Equal variances assumed	.051	.822	.422	58	.674	.515907	1.222087	-1.930366	2.962179
	Equal variances not assumed			.423	57.994	.674	.515907	1.219691	-1.925575	2.957388
CG	Equal variances assumed	1.721	.195	-.742	58	.461	-.389339	.525006	-1.440252	.661573
	Equal variances not assumed			-.748	56.048	.458	-.389339	.520531	-1.432069	.653390

Table 9. OLS Regression

NPL1	Coef.	Std. Err.	t	P>t	95% Conf.	Interval]
ROE1	.3009132	2.279259	0.13	0.895	-4.277113	4.87894
LEVERAGE1	5.136826	3.735766	1.38	0.175	-2.366681	12.64033
ROA1	-6.173178	9.332218	-0.66	0.511	-24.91749	12.57113
Cost to Income1	-1.737101	1.355939	-1.28	0.206	-4.460585	.9863834
size	-15.56705	13.1698	-1.18	0.243	-42.01937	10.88526
Diversification1	-.0890932	.2433118	-0.37	0.716	-.5777993	.3996128
GDP growth rate	-39.82346	57.49244	-0.69	0.492	-155.3004	75.65351
CPI	-20.49401	18.23919	-1.12	0.267	-57.1285	16.14049
CG	-10.48472	21.12232	-0.50	0.622	-52.91015	31.9407
cons	594.3224	491.8494	1.21	0.233	-393.5863	1582.231


```

Random-effects GLS regression           Number of obs   =       60
Group variable: BankCodes              Number of groups =        6

R-sq:  within = 0.1097                  Obs per group:  min =       10
      between = 0.1181                    avg =          10.0
      overall = 0.1102                    max =          10

Wald chi2(9) = 6.19
corr(u_i, X) = 0 (assumed)              Prob > chi2     = 0.7208
    
```

NPL1	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
ROE1	.3009132	2.279259	0.13	0.895	-4.166353	4.768179
LEVERAGE1	5.136826	3.735766	1.38	0.169	-2.185141	12.45879
ROA1	-6.173178	9.332218	-0.66	0.508	-24.46399	12.11763
CosttoIncome1	-1.737101	1.355939	-1.28	0.200	-4.394693	.9204913
size	-15.56705	13.1698	-1.18	0.237	-41.37938	10.24528
Diversification1	-.0890932	.2433118	-0.37	0.714	-.5659755	.3877891
GDPgrowthrate	-39.82346	57.49244	-0.69	0.489	-152.5066	72.85966
CPI	-20.49401	18.23919	-1.12	0.261	-56.24217	15.25415
CG	-10.48472	21.12232	-0.50	0.620	-51.88371	30.91426
_cons	594.3224	491.8494	1.21	0.227	-369.6848	1558.33
sigma_u	0					
sigma_e	238.51051					
rho	0	(fraction of variance due to u_i)				

. estimates store random

. hausman fixed .

	Coefficients			
	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
ROE1	-.067016	.3009132	-.3679292	1.180206
LEVERAGE1	.1543496	5.136826	-4.982476	2.127248
ROA1	-2.385621	-6.173178	3.787557	.
CosttoInco~1	-7.57755	-1.737101	-5.84045	1.675761
size	25.95808	-15.56705	41.52513	12.86828
Diversific~1	-.5373906	-.0890932	-.4482974	.3172103
GDPgrowthr~e	-78.74483	-39.82346	-38.92137	8.761467
CPI	-37.33931	-20.49401	-16.8453	3.665124
CG	-15.68048	-10.48472	-5.19576	.

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

```

chi2(9) = (b-B)'[(V_b-V_B)^(-1)](b-B)
          = 14.40
Prob>chi2 = 0.1089
(V_b-V_B is not positive definite)
    
```

Ho: the random effect is an appropriate
 Ha: Fixed effect is an appropriate.
